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The Side Chambers of San Giovanni Evangelista in Ravenna: Church Libraries of the Fifth Century*

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Abstract

The small chambers symmetrically flanking the main apse of the early fifth-century church of San Giovanni Evangelista in Ravenna, built under the patronage of the empress Galla Placidia of the Theodosian dynasty, are architecturally designed to function as libraries and possibly scriptoria. Contrary to true *pastophoria*, as they are often called, they are not intimately connected with the performance of the eucharistic liturgy. They follow the Roman architectural tradition of libraries as twin structures (one for Greek works and one for Latin), symmetrically arranged around an exedra/apse or open room for reading and debate, and supplied with numerous rectangular niches for manuscript storage. Furthermore, archeological evidence supports the presence of a hypocaust in the northern chamber, a necessary provision in marshy Ravenna to keep the humidity out of the walls in order to better preserve the manuscripts.

The small chambers symmetrically flanking the apse of San Giovanni Evangelista have generally been considered in scholarly literature as *pastophoria*,¹ that is, *prothesis*² and *diaconicon*.³ They have also been casually compared with examples in Syria, where the functions of similar chambers flanking the main apse have occasionally been securely established and are not necessarily that of a *prothesis* and *diaconicon*.⁴ This article discusses these side chambers at San Giovanni Evangelista. After a brief history of the building of the church under the patronage of the empress Galla Placidia, the archeological evidence for a reconstruction of the original architectural form of the chambers is presented. Their function as libraries and possibly scriptoria is established and, finally, these church libraries are revealed as continuations or revivals of the formal tradition of Roman Imperial libraries, and as uniquely well-preserved examples of ecclesiastical libraries of the fifth century.

Building History

The three-aisled basilica of San Giovanni Evangelista in Ravenna was constructed during the time of the empress Galla Placidia, ca. 426–30⁵ (Figs. 1, 2). It was located about 150 m inside the eastern, Late Antique city walls, close to the harbor on marshy ground, and probably stabilized by pilings of alder.⁶ The immediate proximity of

Galla Placidia's palace to the south of the church has been established.⁷ The original narthex was flanked by annexes, but the presence of an atrium in the original Placidian design remains improbable.⁸

There has been some debate as to whether the side chambers were merely extensions of the side aisles rather than enclosed spaces (Fig. 2). According to Grossmann, core samples taken during the 1948–49 restoration of the church proved that the eastern walls of the aisles were bonded to the side chambers, thus confirming that the side chambers, as enclosed spaces, were an integral part of the original Placidian building.⁹ It is not known what these samples actually were, how comprehensively they were taken,¹⁰ or whether the present reconstructed doorways were based on the findings, at least for their widths.¹¹

The second major building campaign, probably under Archbishop Marinianus (ca. 598–606), lengthened the nave by absorbing the narthex into the body of the church.¹² A mosaic fragment containing a partial inscription with letters from Marinianus's name (. . . ARIN . . . IE), originally found at approximately two meters below current grade and located near the eastern end of the southern aisle, indicates an extensive redecoration of the church under that archbishop.¹³ Probably the pavement of the side chambers was also raised at this time. The reason for these changes is not known.¹⁴

The floor of the church was raised again in 1213, probably because of the constantly rising level of the ground water. In 1524, the southern side chamber was completely transformed. A second story was added with access stairs placed against the northern wall of the chamber. Also, the chamber was no longer entered directly from the southern aisle. Rather, one first entered a small antechamber formed from part of the original space of the chamber, and then entered the first level of the two-story complex.¹⁵ In 1568, during a thorough renewal of the church, the whole presbytery zone was redecorated.¹⁶ The floor was possibly raised in 1560 and again in 1765.

From 1919 to 1925, extensive restoration was carried out in an attempt to return the church to its original Early Christian form.¹⁷ Unpublished photographs and drawings made during the 1920s' restoration provide the only currently available evidence of the original state of the lower walls of the side chambers.

In July 1944, Allied bombs, meant for the nearby train station, hit the church and destroyed large portions

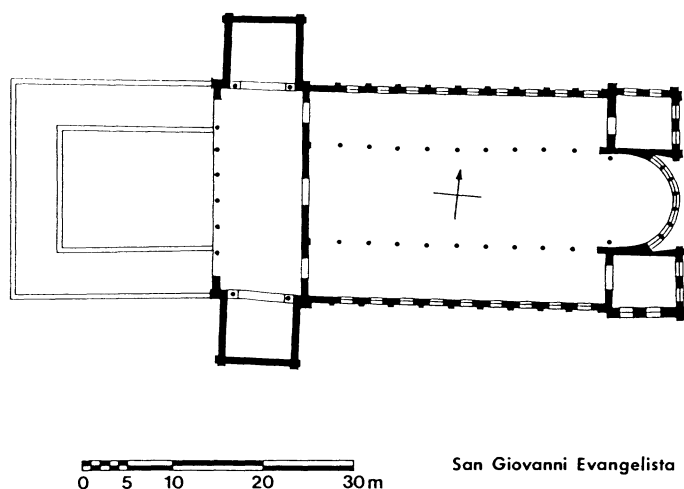


FIGURE 1. Ravenna, San Giovanni Evangelista, plan (Christoph Panfil, after Deichmann).

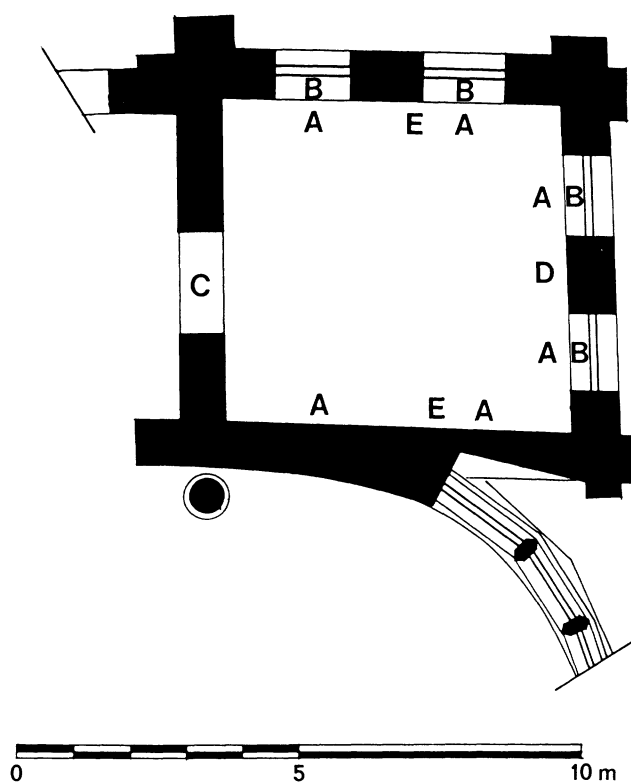


FIGURE 2. San Giovanni Evangelista, plan of the northern side chamber: A=niche, B=window, C=door to aisle, D=small arch, E=evidence of tubuli (after Deichmann).

of it.¹⁸ Extensive damage to the eastern end included the eastern wall of the apse and its vaulting. The southern side chamber was virtually destroyed, losing its entire eastern wall and portions of its northern and southern walls. The northern chamber survived the bombing relatively intact.

Rebuilding and restoration were begun at the end of World War II in 1948¹⁹ (Fig. 3).

Architectural Form of the Chambers

The side chambers of San Giovanni Evangelista directly flank the main apse of the church (Fig. 1). They are relatively equal in size and plan, almost square, the southern room being slightly larger. The approximate interior measurements of the northern chamber are 5½-by-6-m. The interior of the southern chamber measure about 5½-by-6½-m. The original floor level of the main body of the church was 2.71–2.80 m below current grade. The floor level of the chambers is assumed to have been the same.

The side chambers were probably covered by wooden lean-to roofs. The walls with their numerous large windows and niches probably would not have supported masonry vaults. There is no evidence of either multiple stories or stairs in the original side chambers and there are no surviving apses or apsidioles.

Each of the side chambers at San Giovanni Evangelista has six arched, rectangular-plan niches, two evenly spaced in each of the northern, eastern, and southern walls of each chamber; only the western or entrance walls are lacking niches (Figs. 2, 4, 5). There are only small variations in the sizes of these niches (see below).

Table A: Niche Measurements for San Giovanni Evangelista

(Niches are listed counterclockwise from southwestern corner. All measurements are in meters; height from the present pavement level.)

	Height	Width	Depth
Northern chamber	1.00	1.26	0.56
	1.06	1.26	0.56
	1.06	1.26	0.56
	1.07	1.26	0.56
	1.04	1.26	0.56
	1.14	1.26	0.56
Southern chamber	1.00	1.22	0.23
	1.00	1.22	0.58
	1.00	1.22	0.58
	1.01	1.23	0.57
	1.01	1.22	0.56
	1.00	1.21	0.59

Each of the side chambers at San Giovanni Evangelista has four large arched windows, each about 1½ m wide and 2 m high (Figs. 4, 5). All of the windows are about 1½ m above the current pavement, and would have been about 4½ m above the original pavement.

The level of illumination is high in the side chambers because of the large size of the windows, their number, and their even placement in both of the available exterior walls in each chamber. Since the entire building faces east,



FIGURE 3. *San Giovanni Evangelista, apse end, post-World War II restoration (photo: German Archeological Institute, Rome—57.1964).*

illumination is naturally highest early in the morning. The level of the lighting is the same in both chambers at that time, given slight seasonal variations. Later in the day, the southern chamber with its sunlight would have been brighter than the northern, unless, of course, the windows were blocked by the Placidian palace buildings to the south. However, the light in the northern chambers would have been more evenly distributed and more diffuse throughout the room.

The side chambers of San Giovanni Evangelista communicated only with the eastern ends of the aisles. They did not open into the apse or directly to the exterior of the church; therefore, their traffic patterns were fairly simple. They were intended as closed areas, not passageways, and

probably were not involved with the performance of the Eucharistic liturgy since there was no direct access to the chancel/apse area. Chancel barriers followed the line of the nave arcade and did not extend across the eastern ends of the aisles. The doorways are complete reconstructions.²⁰

Archeological Evidence from the Northern Chamber for a Hypocaust System

Sketches and photographs made during the 1920s' excavation show a small arch, about 1 meter wide, located between and below the lower sections of the two niches in the eastern wall of the northern chamber (Figs. 2, 5). The lowest voussoirs of this simple arch were cut back from

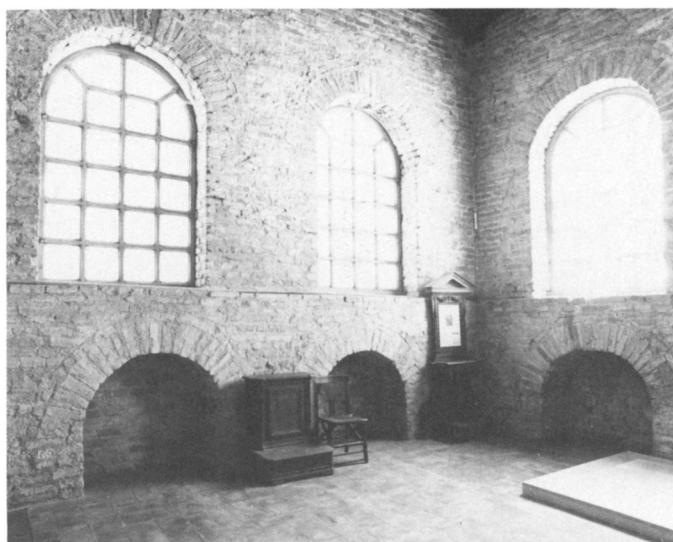


FIGURE 4. *San Giovanni Evangelista*, interior of northern chamber, northern wall and half of eastern wall, showing niches 6, 5, and 4 (photo: German Archeological Institute, Rome—68.1320).

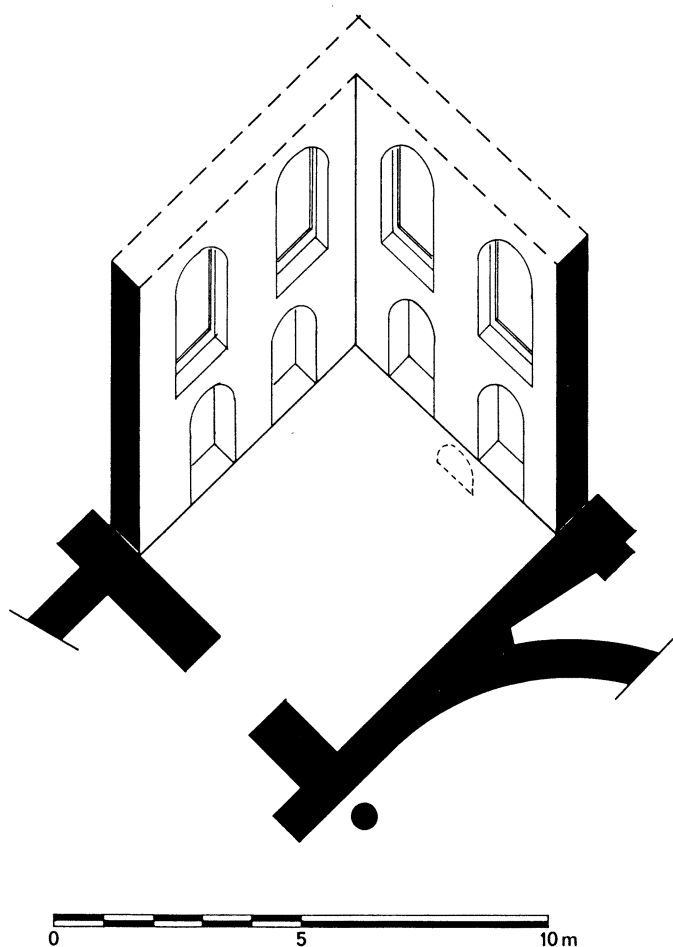


FIGURE 5. *San Giovanni Evangelista*, reconstruction drawing of northern chamber (drawn by C. Panfil).

30 cm to only 20 cm by the open niches on either side. Its careful placement between the two niches and the adjustment of its brick work to this cramped location support the idea that it is original and utilitarian in character. Farioli Campanati thinks this arch was probably over a small door.²¹ It is unusual to have a door in the eastern wall of a side chamber and it is also unusual to have a door between and primarily below two niches. Additionally, although there is no hard evidence of the original pavement or its level, this arch would seem to be too low for a normal door. The size and location of this particular arch suggest that it is a *prae-furnium* arch, and I will return to this possibility.

Unpublished drawings documenting the 1920s' excavation present other important evidence regarding the northern chamber of this church. They show the placement of a series of terra-cotta flue tiles embedded in the southern wall directly under the eastern corner of the eastern niche (Figs. 6, 7). These *tubuli* are grouped to form a vertical channel three tiles wide and probably three high.²² At the top of the channel, there is evidence of horizontally placed *tubuli* branching off westward, directly under the level of the niches. There is no trace of an eastern branch. The single photograph (Fig. 8) in the *Archivio fotografico* showing these *tubuli in situ* and indicating the beginning of the western branch is invaluable, because the entire area was reburied after the restorations. A drawing of the southern wall (Fig. 7) indicates the presence of another, similar channel located directly under the eastern corner of the western niche. Another sketch (Fig. 6) indicates the *tubuli* placed vertically between the two niches and above the horizontal channel of the southern wall. The northern wall also seems to have had *tubuli* and a vertical channel under the western corner of the eastern niche, according to another drawing (Fig. 9).

The presence of the *tubuli* is an indication of a hypocaust system in the chamber²³ (Fig. 10). The level of the suspended floor of the original northern chamber would probably have been close to that of the body of the church.²⁴ The small arch located between and below the two niches of the eastern wall can easily be interpreted as a *prae-furnium* arch, given the presence of the *tubuli*.²⁵

Unfortunately, the archeological evidence found in the northern chamber does not permit an absolutely secure reconstruction of a hypocaust since there is no sign of the required *suspensurae* or of a system of floor channels. One alternative might be a drainage system for rainwater from the roof, but, logically, any roof drain would proceed straight down to below floor level to minimize seepage into the walls from pockets of pooled water. At San Giovanni Evangelista, the channel in the southern wall comes straight down along the side of one niche, then makes a right-angle turn in order to proceed horizontally under the next niche, where it then takes another right-angle turn and proceeds vertically downwards under the

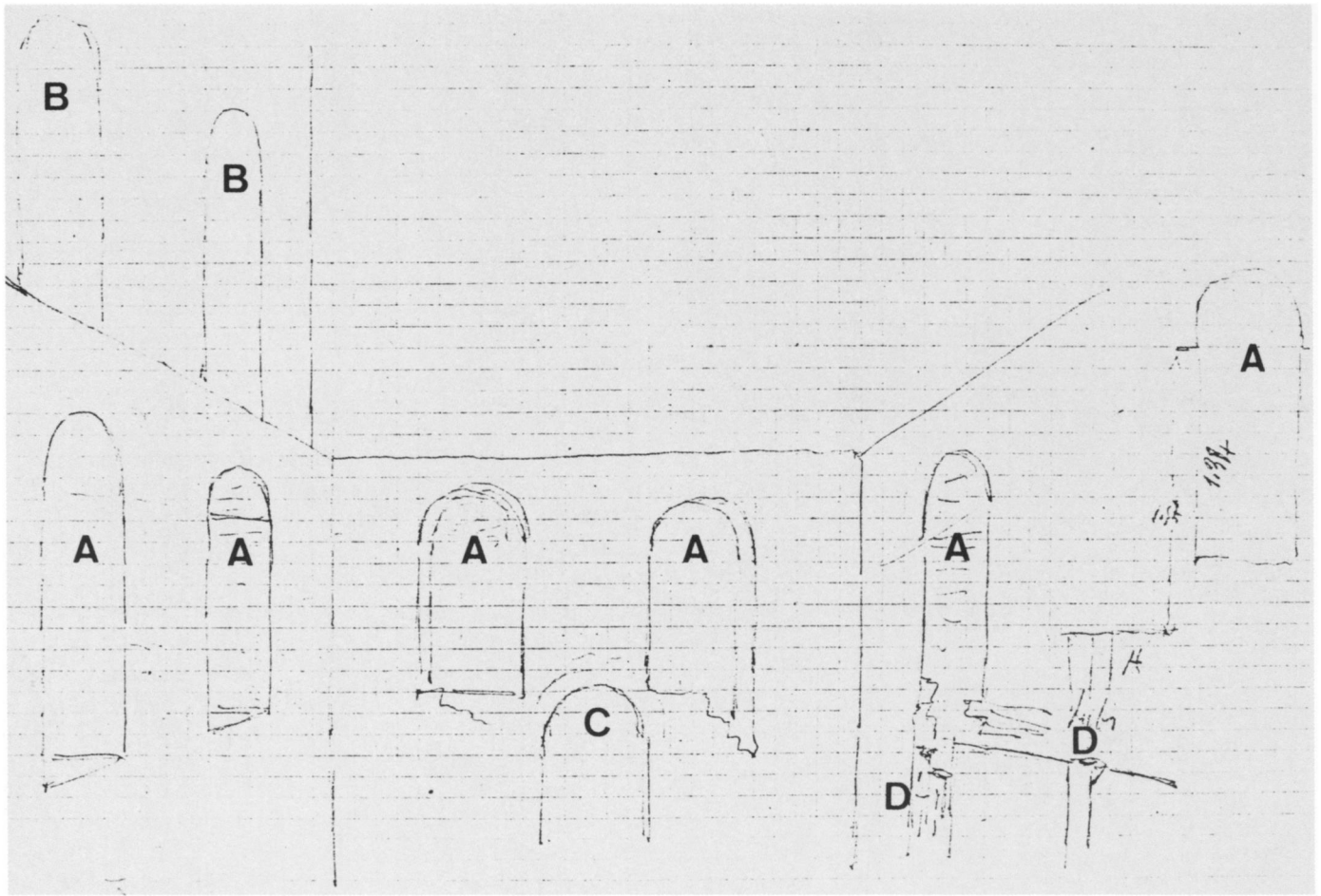


FIGURE 6. *San Giovanni Evangelista, northern chamber, general sketch of the interior made during 1920s' restoration: A=niche, B=window, C=small arch, D=tubuli* (photo: Archivio fotografico, Soprintendenza per i Beni Ambientali e Architettonici della Romagna e Ferrara, Ravenna, hereafter Archivio).

presumed floor level (Fig. 10). I feel that the horizontal branches in this system of *tubuli* are not suitable for the efficient passage of water, and thus preclude their incorporation in a drainage system.

Another possible explanation for these *tubuli* is to facilitate the circulation of fresh air to keep the walls and floor drier. The theory and technology of this kind of ventilation was well known to builders trained in the Roman tradition of constructing grain *horrea* with raised floors and wall vents in order to avoid the high humidity responsible for much grain spoilage.²⁶

Without a detailed examination to discover whether there are traces of soot or ashes on the arch or inside the tiles, either a hypocaust or simple system of channels for the circulation of fresh air remains a possibility, although I favor a hypocaust.²⁷ There was no typical Roman hypocaust system but, rather, the various elements were arranged, added to, and vastly altered depending on the climate, site, purpose, and size of the room, and probably

the availability of materials. The significant issue here is, however, one of the effects of both of these systems, namely to alleviate the problem of humidity in the walls and floor of the room, if not by fresh air circulation, then by the passage of heated air under the floor and through the walls.

Both side chambers have another curious architectural feature. Their northern and eastern walls have a ledge nineteen centimeters wide formed by a setback in the brick wall above the niches and below the windows. Since the southern chamber has been so thoroughly reconstructed, and these ledges are such a minor feature, it might be best to attempt to explain them in terms of the northern chamber. There we see the ledges only on the exterior walls. Thick brick walls were necessary to contain so many niches. It is possible that the setbacks, resulting in relatively thinner upper walls, were merely an economy measure. Another explanation might be that the upper sections of the exterior walls were jacketed with *tubuli*. The set-

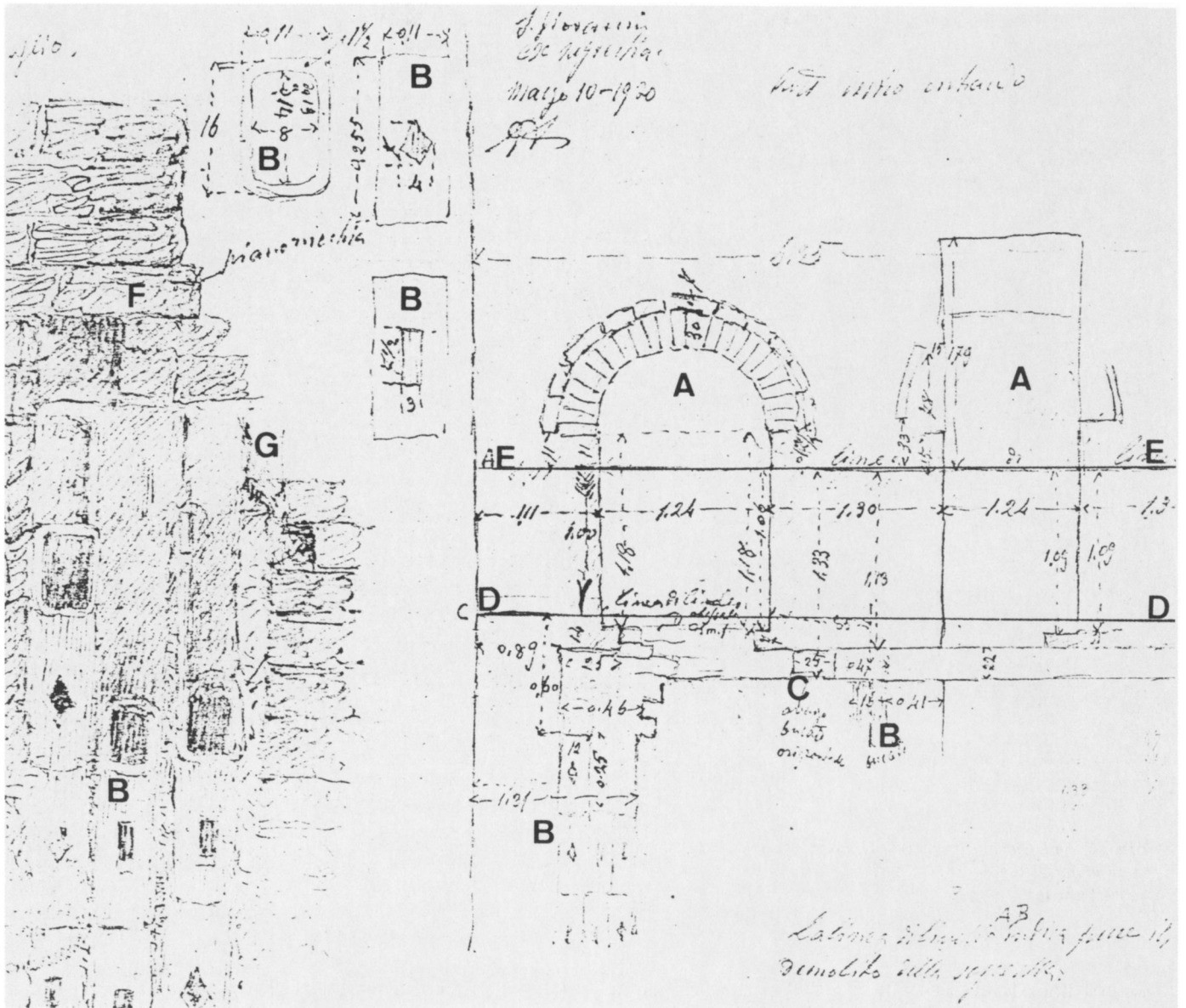


FIGURE 7. *San Giovanni Evangelista*, northern chamber, detail of tubuli and their placement in the southern wall, sketch made during the 1920s' restoration: A=niche, B=vertical tubuli, C=remains of horizontal tubuli, D=proposed floor level with F=niche level, G=horizontal branch of tubuli (photo: Archivio).

back would have been necessary to maintain the planarity of the entire wall and also to help with supporting the tiles. The interior would then be more isolated from exterior moisture and seepage. This, however, remains only a hypothesis.

Architectural Elements of the Side Chambers Relating to their Functions

One of the distinctive architectural elements that offer clues as to the functions of these two side chambers is the

hypocaust in the northern chamber. At *San Giovanni Evangelista* in Ravenna, we have an early example of a heated side chamber in an Early Christian church. Comparison with the two other excavated fifth-century heating systems in Ravenna points toward the uniqueness of that found in the northern side chamber at *San Giovanni Evangelista*. The clerical baths recently discovered at the Banca Popolare construction site and subsequently moved and reconstructed in the courtyard of the Museo Nazionale are thought to have been fifth century,²⁸ as is the so-called palace complex of Theoderic with its private bathing

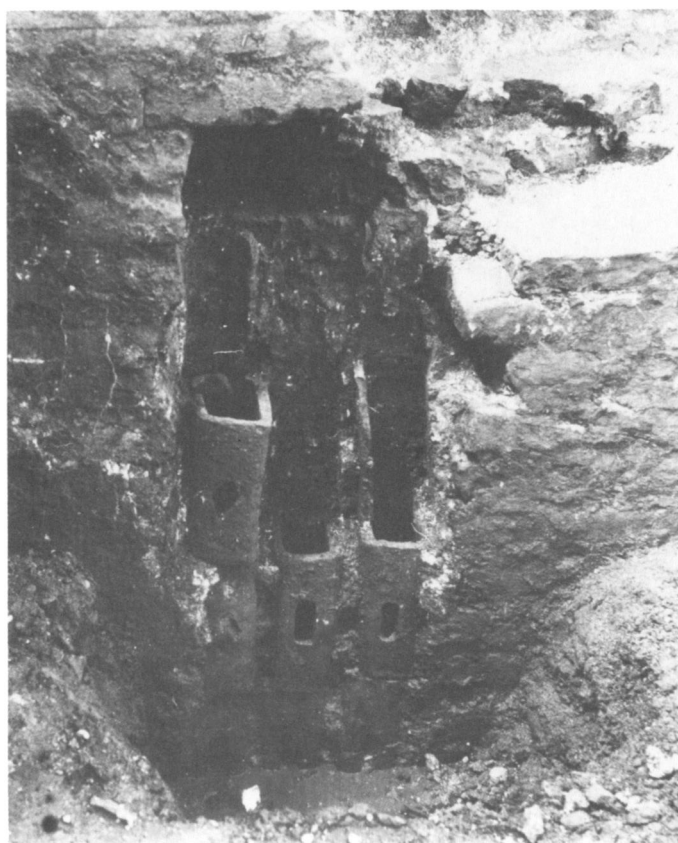


FIGURE 8. *San Giovanni Evangelista, northern chamber, photograph of tubuli (photo: Archivio—1-E-16).*

facilities.²⁹ Although measurements of the individual *tubuli* for these two facilities are currently unavailable, their method of deployment was distinctly different. They were used to jacket the walls, not to form interconnecting channels as at San Giovanni Evangelista. Jacketing the entire wall with *tubuli* resulted in the higher room temperature required for heating sections of a bathing establishment.³⁰ Since this higher temperature was not necessary in the heating of a room for other than bathing purposes, a non-bathing function is suggested for the northern side chamber.³¹

It is not unusual to find an Early Christian church built into a preexisting bath structure, and often ancillary rooms in these churches continued to use the heating and/or bathing facilities.³² However, at San Giovanni Evangelista, we have evidence of a hypocaust system contemporary with an existing side chamber. This is significantly different. Although there is no similar archeological evidence available for the southern chamber, a limited excavation along its eastern wall might be informative. One could logically propose the existence of a hypocaust, since the chambers are identical in all of their other structural features.³³

The fact that at least one, if not both, of the side chambers at this church was originally heated is important in helping to clarify its function. Heating in Roman buildings was often accomplished with charcoal braziers which provided uneven, irregular heat and which were fire hazards in rooms filled with flammable materials.³⁴ In contrast, the hypocaust system gave an even, long-term warmth suitable for a chamber that might be used as a library and/or workroom throughout the cold Ravenna winter. More importantly, however, it would also serve the essential purpose of keeping the dampness out of the walls and floor, an obvious building requirement for a library in marshy Ravenna.

Other distinctive architectural elements in the side chambers of San Giovanni Evangelista are the regularly placed, rectangular-plan niches and the numerous, large windows. The niches have almost the same form (rectangular in plan) and measurements (0.56 m deep and 1.25 m wide) as those niches used for manuscript storage from the ancient libraries at Athens, Timgad, and Ephesus.³⁵ This type of niche and the large number of them placed in a single room were major characteristics of Roman libraries.³⁶ The niches in the first two levels of the Theodosian *skeuophylakion* of Hagia Sophia in Constantinople were more varied in their measurements, but similar in form and arrangement.³⁷

The architectural form of the Roman library had become well defined by the end of the second century A.D.³⁸ In addition to the presence of numerous regularly disposed, rectangular niches, twin library rooms, one for Greek works and one for Latin, were often found flanking a lecture room, open court, or semicircular exedra with benches, suitable for readings and discussion.³⁹ The twin side chambers flanking the apse at San Giovanni Evangelista follow this formal tradition (Fig. 11). The semicircular main apse with its bishop's throne and *synthronon* emphasizing the teaching role of bishops in the Early Church corresponds to the Roman tradition of an architecturally defined area in libraries for reading and discussion.⁴⁰ This image of the bishop as teacher was stressed as well in the mosaic scheme at San Giovanni Evangelista by the juxtaposition of Bishop Peter Chrysologus in mosaic under the figure of Christ flanked by books in the apse, and the location of the flesh-and-blood bishop who officiated under the triumphal-arch representation of Christ handing the Gospel to St. John.

Roman libraries were sometimes provided with double walls to reduce the dampness,⁴¹ and a superficial layer of *tegulae mammatae* or *tubulari* was often used to isolate the inner walls from moisture seeping through the exterior walls.⁴² This was a common practice to facilitate the circulation of fresh air as well as heated air.⁴³

The need to keep the northern chamber warm and/or dry, combined with the presence of the numerous niches

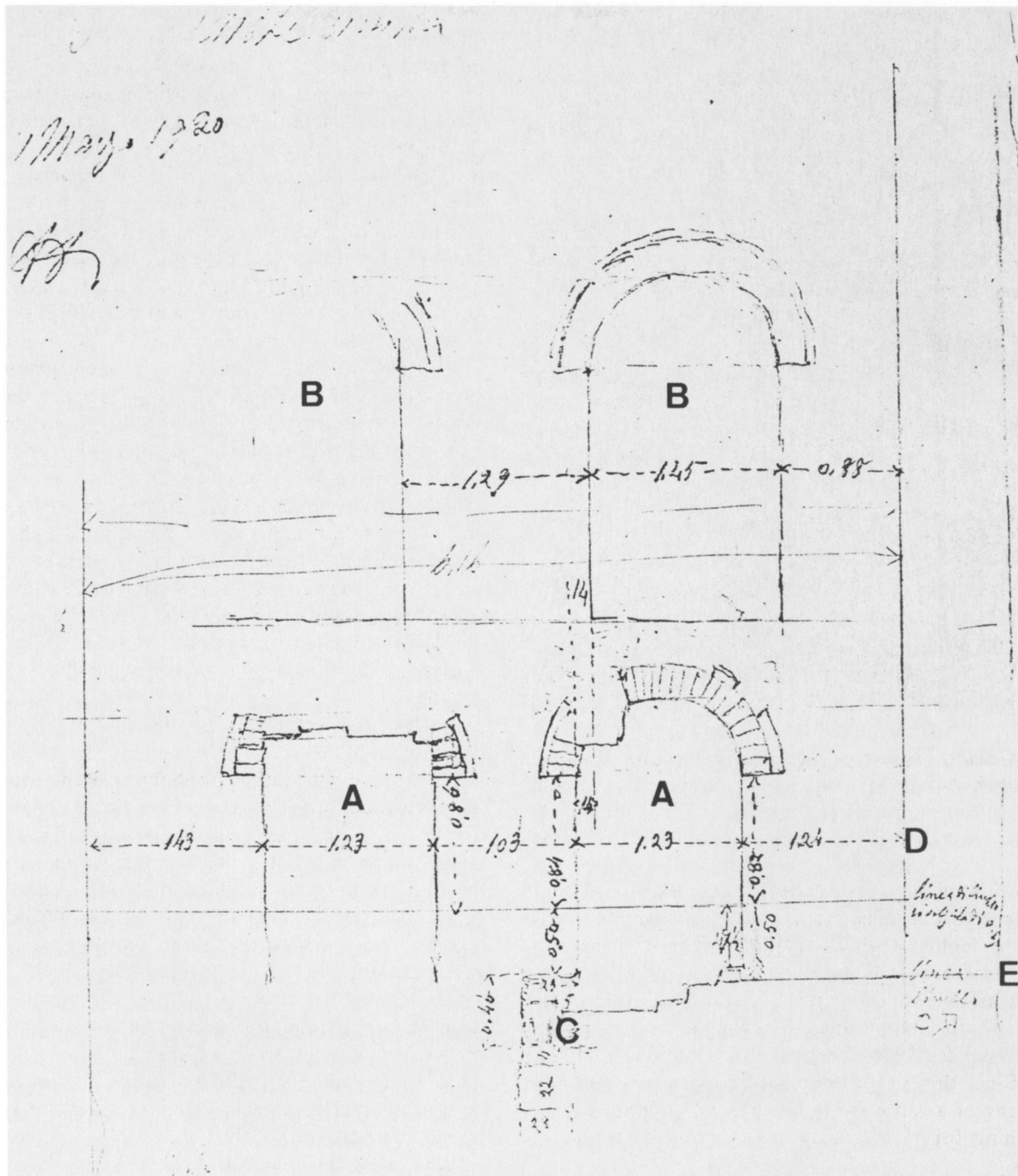


FIGURE 9. *San Giovanni Evangelista*, northern chamber, northern wall as sketched during the 1920s' restoration: A=niche, B=window, C=tubuli evidence, D=present floor level, E=proposed floor level with hypocaust (photo: Archivio).

and windows characteristic of libraries and scriptoria, suggest that the side chambers of this church functioned as manuscript repositories and possibly as reading rooms and/or scriptoria. Chapels, on the other hand, usually have evidence of an architectural focus, such as an apse or

apsidiole, altar, or reliquary cavity. The windows are not so abundant or so evenly distributed over the walls in a chapel as they are at San Giovanni Evangelista, but rather serve to accentuate this focus on the apsidiole and its altar/relics.

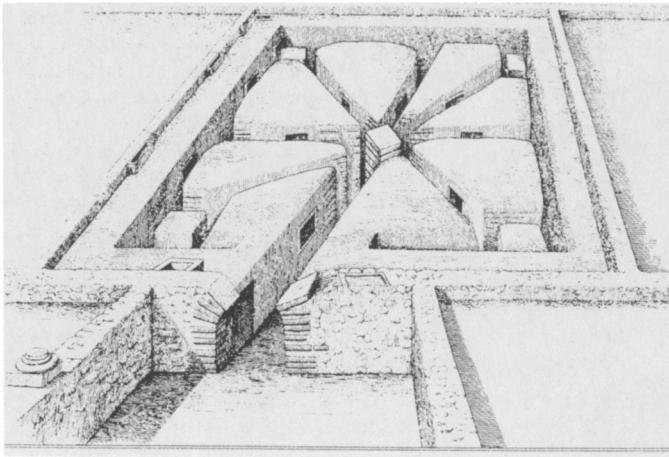


FIGURE 10. *Silchester, England, Roman hypocaust of channeled type. Note the prae-furnium arch and the terra-cotta channels located along the walls (photo: W. Horn and E. Born, The Plan of St. Gall, I, fig. 380).*

Architectural and Historical Context of Early Christian Libraries

The Early Christian library in the West as an architectural type is unknown, if not nonexistent. There are some literary references to ecclesiastical libraries built in the fourth and fifth centuries in the West, but any archeological evidence suggesting their form is quite scarce.⁴⁴ Side chambers or ancillary rooms of churches were known to contain libraries,⁴⁵ and the most famous example was the library/reading room described by Paulinus (353–431) in his church at Nola. The room, called a *secretum*, was located to the left (north) of the main apse,⁴⁶ as was one of the library chambers at San Giovanni Evangelista. Nothing is known of its architectural detailing such as niches or windows. The construction of the library/reading room of Paulinus's church in Nola in the early fifth century was almost contemporary with the side chambers at San Giovanni Evangelista.⁴⁷

Pope Damasus (366–84) possibly added a library/archive to the church of San Lorenzo in Damaso in Rome,⁴⁸ but we know nothing of its architectural form.⁴⁹ A century later, Pope Hilarius (461–68) added two libraries, a bath, and a palace to the church of San Lorenzo fuori le mura in Rome.⁵⁰ This passage in the *Liber Pontificalis* suggests a Latin and a Greek library, but, unfortunately, we hear nothing else of these two libraries from the sources and we know nothing at all about their architectural form. They should probably be understood in the context of a monastery foundation.⁵¹ Chronologically, the next documented Roman ecclesiastical library is that of Pope Agapetus (535–36).⁵² The dedicatory inscription is known and the architectural form of the library—a rectangular room about 30-by-22-m with a central apse and wall niches—has been established through excava-

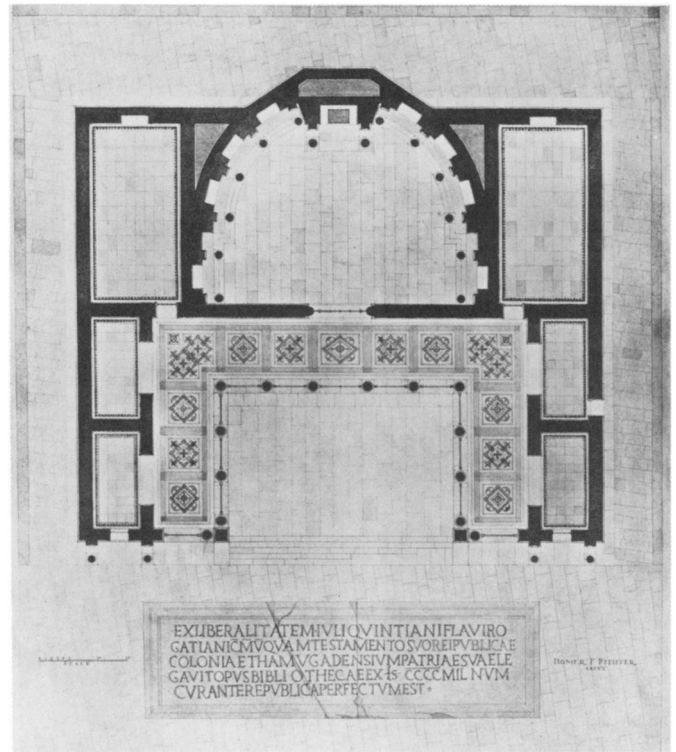


FIGURE 11. *Timgad, Roman Library, reconstruction drawing (photo: H. F. Pfeiffer, "The Roman Library at Timgad," Memoirs of the American Academy in Rome, IX [1931], pl. 16).*

tion.⁵³ Here at last we have proof of the use of wall niches in a sixth-century ecclesiastical setting. Although the later sixth-century library at the Lateran seems to have been located under the present chapel of the *sancta sanctorum*, such a small section of wall has been uncovered that it would be premature to discuss its architectural form.⁵⁴

There is some debate about side chambers functioning as libraries in the East. Weitzmann feels that the two-storied chamber flanking the eastern end of the south aisle of the sixth-century monastery of Saint Catherine at Mount Sinai may have been the original library because of its accessibility to the sanctuary and its two small cabinet niches in the western wall.⁵⁵ Forsyth, however, states that these "two western niches appear, rather, to have been created as service adjuncts" of a later staircase along the southern wall of the chamber, and that there is no archeological evidence to "confirm the existence originally of any room in the church designed to serve as a library." The small number and size of the niches would seem to preclude the storage of a large collection of books in this chamber.⁵⁶

There seems to be some truth to Wendel's claim that the earliest Christian libraries were patterned after small library rooms in private villas and palaces and, therefore, did not utilize wall niches which required thicker walls.⁵⁷ For this reason, they are almost impossible to identify

using purely archeological evidence. However, it is into this context of scant literary evidence and even scantier archeological evidence that we can now place the libraries at San Giovanni Evangelista. In the early fifth century we have a clear example of the use of wall niches and the intimate connection of these ecclesiastical libraries with the main body of the church. Perhaps the increased expense of wall niches was not a limiting factor in the imperially funded church of San Giovanni Evangelista.

There is documentary evidence for a continuing tradition or a revival in the placement of ecclesiastical libraries. Carolingian in date, the plan of St. Gall clearly indicates the location of the library and scriptorium in the northern side chambers of the monastery church.⁵⁸ Although these ninth-century side chambers are two-storied,⁵⁹ the similarity to the placement of the library in the fifth-century church of San Giovanni Evangelista in Ravenna is striking. Carolingian architecture is well known for its revival of Early Christian models.⁶⁰ The placement of the St. Gall monastery library to the left (north) of the chancel might reflect the earlier usage as seen in the surviving chambers at San Giovanni Evangelista and in documents referring to the *secretum* of Paulinus's church at Nola.⁶¹

Conclusions

This is the only known set of paired ecclesiastical libraries from the fifth century. They are simple, rectangular structures, entered only from their respective aisles, whose thickened lower walls contain numerous square-backed niches for *armaria* and whose thinner upper walls contain numerous large windows that flood the interior with light. The supposed formal and functional connection to Syrian models for the side chambers should probably be discarded. Reliquary coffer, exterior doors, and different window and door sizes, which distinguish the usage of the side chambers in Syria, are lacking at San Giovanni Evangelista, where the chambers are almost identical.

They strongly recall earlier Roman library types in three ways. First, they are paired; second, they use numerous wall niches for manuscript storage; and third, their placement on either side of the main apse of the church clearly recalls the Roman auditorium/lecture area in form and function, if not in scale. Whether this formal similarity reflects their imperial patronage and its innately conservative tradition of design or, rather, a conscious return to earlier Roman library models by the Theodosian empress, Galla Placidia, remains to be further explored.

NOTES

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1. G. Galassi, *L'architettura protoromanica nell'Esarcato* (Ravenna, 1928), 7; L. Scevola, "La basilica di San Giovanni Evangelista a Ravenna," *FR*, III (1963), 95; P. Grossmann, "Zum Narthex von San Giovanni Evangelista in Ravenna," *Römische Mitteilungen*, LXXI (1964), 209; G. Bovini, "San Giovanni Evangelista di Ravenna: il problema della sua forma nel primitivo edificio placidiano," *Corsi*, XIV (1967), 78–79; F. W. Deichmann, *Ravenna. Hauptstadt des spätantiken Abendlandes, II, Kommentar I* (Wiesbaden, 1974), 102, where Deichmann, while mentioning *pastophoria* in other churches, carefully calls the side chambers in San Giovanni Evangelista simply "Nebenräume der Apsis." See T. Mathews, "'Private Liturgy' in Byzantine Architecture: Toward a Re-Appraisal," *CA*, XXX (1982), 125–38 which includes a discussion of the use of these chambers in Early Byzantine architecture.
2. Cabrol-Leclercq, *Dictionnaire d'archéologie chrétienne et de liturgie*, XII/2, col. 1951–52, "Offertoire." See G. Babić, *Les chapelles annexes des églises byzantines: Fonction liturgique et programmes iconographique* (Paris, 1969), esp. 58–64. G. Descoedres, *Die Pastophorien im Syro-byzantinischen Osten* (Wiesbaden, 1983) has a thorough discussion of the usage of the terms *pastophoria*, *prothesis*, and *diaconicon* in ancient times.
3. Cabrol-Leclercq, *Dictionnaire*, IV/I, col. 733–34, "Diaconicum."
4. J. Lassus, *Sanctuaires chrétiens de Syrie* (Paris, 1947), passim, and G. Tchalenko, *Villages antiques de la Syrie du Nord, I–III* (Paris, 1953–58), passim. Also see more specifically Descoedres, *Die Pastophorien*, passim.
5. Deichmann, *Kommentar I*, 94.
6. C. Giovannini and G. Ricci, *Le città nella storia d'Italia. Ravenna* (Rome-Bari, 1985), 24. Vitruvius mentions that the foundations of all the public and private buildings of his time in Ravenna were supported by piles of alder wood (Vitruvius, *De architectura libri decem*, II.9.2). Pilings were found under the foundation of Santa Croce during the recent excavations and the consolidation of the site with a pumping system.
7. Deichmann, *Kommentar I*, 97 and 116–17.
8. Grossmann, *Mitteilungen*, 206–28, specifically 213 and 228.
9. *Ibid.*, 99–101.
10. I have found only oblique references to these core samples in the literature and, therefore, I have not personally examined the actual evidence that they presented.
11. The southern chamber doorway was restored as an arch and the northern one as trabeated. I have not been able to find information explaining why this was done or detailing the preresoration state of the doors. In scholarly circles, it was well known at the time of the restoration that in Syria the southern chamber was often entered through a wide arch, while the northern one was entered through a smaller trabeated door. It would be significant to know if the restorers were influenced by this information, especially since the

- existence of the side chambers at San Giovanni Evangelista has always been ascribed to Syrian influence. The Renaissance transformation of the southern chamber included a wide door. It is possible that the twentieth-century restoration width of the entryway was based on the width of this Renaissance door. The unanswerable question is whether the Renaissance width was based on that of a preexisting doorway.
12. Grossmann, *Mitteilungen*, passim.
 13. R. Farioli, "I mosaici pavimentali della Chiesa di S. Giovanni Evangelista in Ravenna," *FR*, Ser. 1, IV (1970), 169–222. The fragment contains some of the letters of Marinianus's name and was first discovered during restoration work done in 1919, then lost, and now recently rediscovered. This article is a good discussion of all the mosaic pavement fragments of the church, their levels, dating, and stylistic considerations.
 14. Archbishop Marinianus was chosen by Pope Gregory the Great for the Ravennate episcopacy. He had been a fellow monk as well as a friend of Gregory's in Rome. An earlier friend and archbishop of Ravenna chosen by Gregory was John the Roman (578–95), who constructed the monastic buildings at Sant'Apollinare in Classe between 575–95. Monastic buildings were supposedly constructed at San Giovanni Evangelista around 890. It is my hypothesis that monks were installed at the church by Archbishop Marinianus and this was the reason for expanding the interior space of the building by including the narthex in the body of the church. In any case, San Giovanni Evangelista became one of the four most powerful abbeys in Ravenna in the later Middle Ages. See Giovannini and Ricci, *Ravenna*, 93–94, with additional bibliography on 130, n. 39.
 15. Scevola, *FR*, III, 5–107.
 16. Deichmann, *Kommentar I*, 101.
 17. G. Gerola in the *Corriere di Romagna* 57, nr. 278. Sunday, 26 October 1919, where he discussed the work necessary to free the church from its Baroque additions. See also G. Gerola, "L'architettura deutero-bizantina in Ravenna," *Ricordi di Ravenna medioevale* (Ravenna, 1921), 69.
 18. Deichmann, *Kommentar I*, 101. Deichmann reproduces contemporary photographs of the damage, see illustrations 49–51. See also C. Capezzuoli, "Danni di guerra ai monumenti di Ravenna e restauri compiuti," *FR*, Fasc. I (1950), 71 for a listing of war damage and the subsequent restorations.
 19. L. Crema, "San Giovanni Evangelista di Ravenna alle luce delle ultime indagini," *Corsi*, V (1958), 55–58, and C. Capezzuoli, "L'abside della basilica paleocristiana di San Giovanni Evangelista in Ravenna," *Studi Romagnoli*, III (1952), 27–29.
 20. The northern chamber is entered by a rectangular opening whose height is roughly 2½ m and whose width is 2 m. There is no evidence as to what type of door, if any, originally closed this opening since the entire wall is a reconstruction. A wide archway connects the southern chamber with its aisle. The original existence of an archway cannot be proven by the available evidence, but perhaps the width of the opening, about 3 m, can be postulated. The height of the present arch is roughly 3½ m, more than one meter higher than the entrance to the northern chamber, and the opening is about ½ m wider than the opening from the northern chamber into the northern aisle. This great width might have been the reason for the reconstruction of an arched doorway, rather than a trabeated one.
 21. Farioli, *FR* (1970), 169–222. Farioli does not reproduce the sketch that is found along with most of Azzaroni's other sketches in the Soprintendenza di Monumenti di Ravenna. Mazzotti mentions this arch which he apparently saw and thought was either from a door or window. M. Mazzotti, *La basilica di Sant'Apollinare in Classe* (Vatican, 1954), 70, n. 37.
 22. Each *tubulus*, or hollow box tile, is 25-by-12-by-16-cm and opened by a rectangular or diamond-shaped hole in its front face. G. Pavan, "I mosaici della chiesa di S. Croce a Ravenna, vecchi e nuovi ritrovamenti," *FR*, Ser. 4, CXXVII–CXXX (1984–85), 341–80. Pavan mentions *tubuli* found in a Roman house of the late second or early third century excavated under the church of Santa Croce, slightly east of the eastern cross arm. These *tubuli* were lined up along the southern wall of the probably rectangular area; they were not arranged in channels as at San Giovanni Evangelista. Although the length is not given, the width and thickness of the *tubuli* are given as 15 and 10 cm (see 357).
 23. R. J. Forbes, *Studies in Ancient Technology*, Vol. VI, *Heat and Heating, Refrigeration, Light* (Leiden, 1966) and F. Kretschmer, "Hypokausten," *Saalburg Jahrbuch*, XII (1953), 7–41.
 24. The lowest level reached by the extant *tubuli* was about 3 to 3½ m below current grade. This is below what is considered to be the original pavement level of the main body of the church, namely 2.71–2.80 m. However, if the open area under the suspended floor was from 40 to 60 cm (Forbes, *Studies*, 37), the level would be brought up to 3.0–2.80 m. The pavement thickness might have varied from 20 to 40 cm. The heated room of the fifth-century baths discovered under Santa Maria di Palazzolo near Ravenna had an open space of only 70 cm. See G. B. Montanari, "S. Maria di Palazzolo (Ravenna)," *Arheološki Vestnik*, XXIII (1972), 212–18, especially 214.
 25. The width of the *praefurnium* arch, about 1 m, corresponds with that of another fifth century *praefurnium* arch discovered at Santa Maria di Palazzolo near Ravenna. See Montanari, *Arheološki Vestnik*, 212–18.
 26. G. Rickman, *Roman Granaries and Store Buildings* (Cambridge, England, 1971), passim. See also M. Blake, *Roman Construction in Italy from Nerva through the Antonines* (Philadelphia, 1973), 91, 113–15, where she presents some of the many inventive techniques for keeping the humidity out of floors and walls and for hypocaust systems per se.
 27. See articles in Pauly-Wissowa, *Real-Encyclopädie der classischen Altertumswissenschaft*, "Heizung" (VII, col. 2646) and "Hypocaustum" (IX, col. 333) for a complete description and additional bibliography. The small arch was the opening to the exterior *praefurnium* (oven, firebox) and the hollow terra-cotta rectangles are *tubuli*, which are the box flue tiles. "The tubulus seems to be the ultimate development in the construction of flues. It found application both in continuous tubulation and as single chimneys for cooler rooms. It appears in the luxury villa that were destroyed by the eruption of Vesuvius in A.D. 79 . . ." This quote is from T. Rook, "The Effect of the Evolution of Flues upon the Development of Architecture," in *Roman Brick and Tile. Studies in Manufacture, Distribution and Use in the Western Empire*, ed. by A. McWhirr (BAR International Series 68, 1979), 303–8. See also Vitruvius, *De architectura*, X, for the technology of this heating system. See O. Krell, *Altrömische Heizungen* (Munich, 1901), especially chapters 6 and 7 for a good discussion of the heating in Roman buildings. See *Germania*, XXXIII (1955) for two very interesting articles regarding the hypocaust on a large scale found at the fourth-century *aula palatina* in Trier: W. Reusch, "Die Aula Palatina in Trier," 180–99 and F. Kretschmer, "Die Heizung der Aula Palatina in Trier," 200–210. For a probable later example of the hypocaust in a church/monastery complex, see W. Horn and E. Born, *The Plan of St. Gall*, II (Berkeley, 1979), 128–32.
 28. G. B. Montanari, "Recenti rinvenimenti archeologici a Ravenna," *Corsi*, XXVII (1981), 13–14, dates the original bath structures to the fifth century.

29. G. Ghirardini, "Gli scavi del Palazzo de Teodorico di Ravenna," *Monumenti antichi pubblicati per cura della reale Accademia dei Lincei*, XXIV (1918), cols. 738–841.
30. Kretschmer, *Saalburg*, 7–41, discusses this distinction in optimum temperature for rooms of different functions.
31. See J. Zeller, *Bad und Bäder in der altchristlichen Kirche* (Munich, 1928), especially 27–30, and A. Berger, *Das Bad in der byzantinischen Zeit*, *Miscellanea Byzantina Monacensia*, XXVII (Munich, 1982).
32. The excavations at Aizanoi in Turkey have recently uncovered an example of a heated ancillary room of the Justinianic period, and this room made use of the heating system of a previously existing bath complex. See *Anatolian Studies*, XXXIV (1984), 203, and *Anatolian Studies*, XXXV (1985), 175.
33. The southern chamber has undergone several major alterations during the centuries which the northern chamber has not. Perhaps this is the reason that some evidence of the hypocaust remains in the northern chamber.
34. See Krell, *Heizungen*, and Pauly-Wissowa, VII, "Heizungen."
35. B. Gotze, "Antiken Bibliotheken," *Jahrbuch des deutschen archäologischen Instituts*, LII (1937), 238–40. Niches from the library in Hadrian's stoa in Athens were 0.50 m deep, 1.22 m wide, and 2.83 m high. Those from the library at Ephesus were 0.50 m deep, 1.00 m wide, and 2.83 m high. At the Timgad library, the niches were 0.50 m deep and 1.25 m wide. The library itself resembled an apsed church with side chambers. H. F. Pfeiffer, "The Roman Library at Timgad," *Memoirs of the American Academy in Rome*, IX (1931), 157.
36. E. Makowiecka, *The Origin and the Evolution of the Architectural Form of the Roman Library* (Warsaw, 1978), passim. She mentions that Greek libraries did not have niches, but that all Roman libraries after the Palatine library did (30–31).
37. G. Majeska in his talk, "Notes on the Skeuophylakion of St. Sophia," at the 15th Annual Byzantine Studies Conference in 1989 gave the following measurements: first level niches 1.35 m wide and 0.9 m deep; second level niches 1–1.43 m wide and 0.48–0.77 m deep. T. Mathews pointed out to me the numerous niches in the skeuophylakion of Santa Sophia and that of Saint John's at Ephesus and their similarity to Roman library niches.
38. Makowiecka, *Library*, passim.
39. In addition to Makowiecka, *Library*, see C. Callmer, "Antiken Bibliotheken," *Opuscula Archaeologica*, III (1944), 145–93 and G. De Gregori, "Biblioteche dell'antichità," *Accademie e biblioteche d'Italia*, XI–1/2 (April 1937), 9–24. Examples include the libraries attached to the Basilica Ulpia in Trajan's forum which functioned well into the fifth century, according to Sidonius Apollonaris, *Epistl.*, IX, 16, 3, 25–28.
40. A. Harnack, *Bible Reading in the Early Church*, trans. J. R. Wilkinson (New York, 1912), passim.
41. See Pfeiffer, *Memoirs*, 162.
42. Vitruvius, *De architecture*, VII, 4.1–3.
43. M. Blake, *Roman Construction in Italy from Tiberius through the Flavians* (Washington, D.C., 1959), passim. See also Krell, *Heizungen*, passim, who felt that hypocaust construction was most often used for drying purposes and that it provided very slight and inefficient heating. His arguments have in large part been refuted by further archeological evidence, but certainly one of the results of the hypocaust heating was to keep the humidity out of the walls. See also Vitruvius, and Rook, *Tile*, 304–5.
44. C. Wendel's extensive writings include short discussions of Early Christian libraries. See his "Die bauliche Entwicklung der antiken Bibliothek," *Zentralblatt für Bibliothekswesen*, LXIII (1949), 407–28, especially 426–28, and his discussion under the heading "Bibliothek" in the *Reallexikon für Antike und Christentum*, II (1951–54), col. 231–74, especially 246–74. Callmer has also published a section about them in his article on ancient libraries (*Opuscula*, esp. 190–93).
45. See the "Bibliothek" heading in *Reallexikon zur byzantinischen Kunst*, I (Stuttgart, 1966), cols. 612–15. Also see C. Wendel, "Bibliothek," *Reallexikon für Antike und Christentum*, II (Stuttgart, 1954), col. 246, and J. W. Thompson, *The Medieval Library* (reprint, New York, 1967) which mentions on 313 that Theodosius II was an excellent scholar, book collector, and illuminator and copyist. Harnack, *Bible* also provides interesting background. See also E. D. Roberts, "Notes on Early Christian Libraries in Rome," *Speculum*, IX (1934), 52.
46. Harnack, *Bible*, passim. Harnack also discusses the importance of Bible reading in the late fourth and early fifth centuries, mentioning particularly St. John Chrysostom's emphasis in his teachings. See R. C. Goldschmidt, *Paulinus' Church at Nola* (Amsterdam, 1940), 45.
47. Goldschmidt, *Paulinus*, 45.
48. L. Duchesne, *Le Liber Pontificalis*, I (Paris, 1881–92, 1955), 212–15.
49. R. Krautheimer, *Corpus Basilicarum Christianarum Romae*, II (Vatican City, 1959), 145–51.
50. Duchesne, *L.P.*, I, 245. I would like to thank R. Krautheimer for bringing this passage to my attention.
51. Wendel, *Reallexikon*, 256.
52. Duchesne, *L.P.*, I, 287–89.
53. Callmer, *Opuscula*, 191 and H. J. Marrou, "Autour de la bibliothèque du Pape Agapet," *Mélanges d'Archéologie et d'Histoire*, XLVIII (1931), 124–69.
54. P. Lauer, "Les fouilles du Sancta Sanctorum au Latran," *Mélanges d'Archéologie et d'Histoire*, XX (1900), 251–87.
55. K. Weitzmann, *Illustrated Manuscripts at St. Catherine's Monastery on Mt. Sinai* (Collegeville, Minnesota, 1973), 7. I would like to thank S. Čurčić for bringing this to my attention and K. Weitzmann for discussing his ideas about this chamber with me.
56. Letter from G. H. Forsyth, Jr. of November 26, 1988. See also G. H. Forsyth, "The Monastery of St. Catherine at Mount Sinai: the Church and Fortress of Justinian," *DOP*, XXII (1968), 11, n. 13.
57. Wendel, *Zentralblatt*, 426–28.
58. Horn and Born, *St. Gall*, I, 147.
59. W. Horn, "The Medieval Monastery as a Setting for the Production of Manuscripts," *Journal of the Walters Art Gallery*, XLIV (1986), 16–47.
60. R. Krautheimer, "The Carolingian Revival of Early Christian Architecture," *AB*, XXV, 1–38.
61. See also G. H. Forsyth, Jr., *The Church of St. Martin at Angers* (Princeton, 1953), 42, n. 244 and 150, n. 268.